

Patent Application No. 10/726,387
Attorney File No. 63833-5028

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A composite construction having a material microstructure comprising a plurality of randomly arranged granules that randomly arranged with one another, each granule comprising a first material phase and a second material phase that are each continuous and in an ordered arrangement that each occupy a different and distinct region regions of the granule, wherein the first material phase comprises a material or precursor for forming a material selected from the group consisting of ~~cermet~~ materials, polycrystalline diamond, polycrystalline cubic boron nitride, and mixtures thereof, and wherein the second material phase comprises wherein one of the first or second material phases comprises a material that in sintered form is relatively softer than the other of the first or second material phases phase, and wherein at least a portion of the first or second material phase phases of each granule are one or more granules in contact with one another a portion of a same material phase of an adjacent granule.

2. (Original) The composite construction as recited in claim 1 wherein each granule comprises a centrally positioned core that is formed from one of the material phases, and a shell that surrounds at least a portion of the core and that is formed from the other of the material phases.

3. (Original) The composite construction as recited in claim 2 wherein each granule has a cylindrical configuration with the shell disposed concentrically around the core.

4. (Original) The composite construction as recited in claim 1 wherein the granule first and second material phases are formed from the same general type of material.

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5. (Currently Amended) The composite construction as recited in claim 1 wherein the material microstructure further comprises comprising a binder phase interposed between the plurality of randomly arranged granules.

6. (Cancelled)

7. (Currently Amended) A composite construction comprising formed from a plurality of combined granules, each granule including the construction having a material microstructure comprising:

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 a plurality of first material region regions having a continuous first material phase a each comprising a material or precursor for forming a material selected from the group consisting of cermet materials, polycrystalline diamond, polycrystalline cubic boron nitride, and mixtures thereof, wherein the first material regions are each formed from a first material phase of the granules; and

a second material region having a continuous second material phase formed from surrounding the first material regions and comprising a material selected from the same group of materials as that used to form the first material region, wherein the second material region is formed from a second material phase of each of the granules that is distinct from the granule first material phase that can be the same as or different than the first material phase, the first and second regions being distinct from one another, and wherein when the granules are combined the second material phases of the granules contact one another to form the second material region being in contact with one another;

wherein the plurality of granules are arranged with one another in random fashion to provide a randomly-oriented microstructure, and wherein the randomly-oriented microstructure is disposed along a working surface of the composite construction.

8. (Currently Amended) The composite construction as recited in claim 7 wherein the second material phase region has a degree of hardness that is different from that of is relatively softer than the first material region phase.

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10. (Currently Amended) The composite construction as recited in claim 7 wherein the granule first material phase region is a centrally partitioned positioned core, and the granule second material phase region is a shell that surrounds at least a portion of the core.

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11. (Currently Amended) The composite construction as recited in claim [8] 7 wherein the core and shell are each cylindrical in configuration.

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12. (Currently Amended) The composite construction as recited in claim 7 further comprising a continuous matrix binder phase region, and wherein the granules are distributed therein composite first and second material regions are dispersed therein.

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13. (Original) A subterranean drill bit comprising a wear surface formed from the composite construction as recited in claim 7.

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14. (Currently Amended) A composite construction formed by combining comprising a plurality of combined granules, each granule the construction including:

a continuous polycrystalline diamond phase occupying a plurality of first region of the granule regions that are formed from a first material phase of the granules comprising polycrystalline diamond; and

a continuous cemented tungsten carbide phase occupying a second region of the granule formed from a second phase of the granules, wherein the granule second phase is formed from polycrystalline diamond that is distinct from and in contact with the polycrystalline diamond phase first region;

wherein the plurality of granules are combined together so that the first and second regions phases of adjacent granules are randomly oriented with respect to one another.

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15. (Currently Amended) The composite construction as recited in claim 14 wherein each granule comprises a cylindrical structure having a centrally-positioned core and a surrounding shell, and wherein the core is the first region phase and the shell is the second region phase.

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 16. (Currently Amended) The composite construction as recited in claim *14* further comprising a continuous matrix binder phase, and wherein the interposed between the granules are disposed therein.

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 17. (Currently Amended) A rotary cone subterranean drill bit comprising:
 a bit body including at least one journal pin extending from a leg portion of the bit;
 a cutter cone rotatably mounted on the journal pin; and
 an insert disposed along a surface of the cutter cone, the insert comprising a composite construction positioned along a working surface of the insert, the composite construction having a material microstructure comprising formed from a sintered combination of randomly arrangement of arranged granules, each granule comprising a first and second material phase that are each continuous and in an ordered arrangement that each occupy a different distinct region regions of the granule, wherein the first material phase comprises a hard material or precursor for forming a material selected from the group consisting of cement materials, polycrystalline diamond, polycrystalline cubic boron nitride, and mixtures thereof, and wherein the second material phase comprises wherein one of the first or second material phases comprises a material that in sintered form is relatively softer than the other of the first or second material phases phase, and wherein at least a portion of the first or second material phase phases of each granule are one or more granules in contact with one another a portion of a same material phase of an adjacent granule.

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 18. (Currently Amended) The drill bit as recited in claim *17* wherein the granule comprises a centrally positioned core that is formed from the first material phase, and a shell in contact with the core that is formed from the second material phase.

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 19. (Canceled)

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 20. (Currently Amended) A method for producing a composite construction comprising:

26. forming a green-state component plurality of granules each having continuous first and second material phases that occupy distinct portions of the component and that are in contact with one another each respective granule, wherein the granule first material phase comprises a material or precursor for forming a material is selected from the group consisting of cermets cermet materials, polycrystalline diamond, polycrystalline cubic boron nitride, and mixtures thereof, and wherein the granule second material phase is formed from a material that is relatively softer than the first material phase;

27. processing the green-state component into a plurality of granules;

28. combining and arranging the plurality of granules together in a random fashion to form a green-state product mixture; and

29. consolidating and sintering the green-state product mixture at high-temperature, high-pressure conditions to produce a composite construction having a material microstructure comprising the randomly arranged plurality of granules;

30. wherein the composite construction comprises a plurality of first regions formed from the granule first material phases disbursed in a construction second region formed from the granule second phases.

20. 31. (Currently Amended) The method as recited in claim 26 wherein during the step of combining, further comprising dispersing the plurality of granules into a continuous binder phase material.

21. 32. (New) The construction as recited in claim 1 wherein a first phase of at least one of the granules contacts a second phase of an adjacent granule.

22. 33. (New) The construction as recited in claim 1 wherein the granule first phase and second phases are both formed from a polycrystalline diamond precursor material, and wherein the diamond content in the granule first phase is different from that in the second phase.

23. 34. (New) The composite construction as recited in claim 1 wherein the material used to form the granule first phase has a grain size that is different from that of the material used to form the granule second phase.

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25. (New) The construction as recited in claim 7 wherein a first phase of at least one of the granules contacts a second phase of an adjacent granule.

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26. (New) The construction as recited in claim 7 wherein the granule first phase and second phases are both formed from a polycrystalline diamond precursor material, and wherein the diamond content in the granule first phase is different from that in the second phase.

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27. (New) The composite construction as recited in claim 1 wherein the material used to form the granule first phase has a grain size that is different from that of the material used to form the granule second phase.

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28. (New) The composite construction as recited in claim *17* wherein at least a portion of the first or second material phase of one or more granules is in contact with a portion of a same material phase of an adjacent granule.

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29. (New) The construction as recited in claim *17* wherein a first phase of at least one of the granules contacts a second phase of an adjacent granule.

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30. (New) The construction as recited in claim *17* wherein the granule first phase and second phases are both formed from a polycrystalline diamond precursor material, and wherein the diamond content in the granule first phase is different from that in the second phase.

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31. (New) The composite construction as recited in claim 1 wherein the material used to form the granule first phase has a grain size that is different from that of the material used to form the granule second phase.

wherein the construction first and second regions each comprise polycrystalline diamond, and where the polycrystalline diamond in the first region has a different proportion of diamond than that in the second region.

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32. (New) The composite construction as recited in claim 20 wherein the material used to form the granule first phase has a grain size that is different from that of the material used to form the granule second phase.

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33. (New) A composite construction formed by sintering a combination of granules, the composite construction comprising:

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a plurality of first material regions comprising a material selected from the group consisting of polycrystalline diamond, polycrystalline cubic boron nitride, and mixtures thereof, the plurality of first regions being defined by a core of the granules;

a second material region comprising a material selected from the group consisting of polycrystalline diamond, polycrystalline cubic boron nitride, and mixtures thereof, the plurality of first material regions being dispersed within the second material region, the second material region being defined by a shell that surrounds the core of the granules;

wherein the first and second material regions comprise the same material and have different proportions of the same material constituent, and wherein the granules are combined in a random arrangement.